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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 02350PC/LE/LN	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE 2003/001492	International filing date (day/month/year) 25.09.2003	Priority date (day/month/year) 25.09.2002
International Patent Classification (IPC) or national classification and IPC F23D 14/32, F23C 3/00, F23C 9/00		
Applicant Linde AG et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 4 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☐ (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 02.03.2004	Date of completion of this report 20.12.2004
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Form PCT/IPEA/409 (cover sheet) (January 2004)

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE 2003/001492

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☒ the international application as originally filed/furnished
- ☐ the description:
- pages _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ the drawings:
- pages _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE 2003/001492

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-21</u>	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	<u>1-21</u>	NO
Industrial applicability (IA)	Claims	<u>1-21</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention concerns a method and a burner apparatus, using oxy-fuel technology, for heat treatment of materials. The invention aims to solve the problems associated with oxy-fuel burners, i.e. high flame temperatures. The invention solves this problem by providing for a recirculation of exhaust gas.

The documents cited in the International Search Report:

D1: US, 4 601 655, A
D2: DE, 196 00 380, A1
D3: JP, 55 107811, A

Document D1 is considered to represent the closest prior art. D1 discloses an oxy-fuel burner (1) (col. 1, lines 23-33) providing for a recirculation of exhaust gases to cool the flame. The exhaust gases are drawn in by and mixed with the supplied oxygen (5, 7) (col. 3, lines 31-32 and col. 6, lines 7-12). This mixture is subsequently combusted together with the supplied fuel (9) (figure 9).

The claimed invention according to claim 11 differs from D1 in that it specifies that the oxygen is supplied at supersonic velocities. D1 does not specify the velocity of the supplied oxygen. However, D1 indicates (col.6, lines 7-12) the use of an ejector device using the oxygen supply to accelerate the exhaust gases. To do this the oxygen supply has to have a certain velocity. Therefore, the claimed invention according to claims 11-15 and 18 is not considered to involve an inventive step in view of D1.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: BOX V

Further, the method according to claim 1 differs from D1 by providing a secondary recirculation by recirculating exhaust gases from the flame to the previously created oxygen-exhaust-fuel mixture. This secondary recirculation brings down the flame temperature further.

Consequently, with the background of D1, the problem is to develop a method which further lowers the flame temperature.

D2, however, discloses a burner (figure 1) for air (8) where exhaust gases are recirculated in order to lower the flame temperature and thereby reduce the formation of NO_x. D2 also shows a secondary recirculation of exhaust gases (25, 26) for an additional lowering of the flame temperature (col. 4, lines 6-9 and lines 30-42).

Hence, both D1 and D2 concern burner arrangements aiming to lower the flame temperature of the burner. The person skilled in the art, trying to solve the above problem, would also consider burner arrangements, other than oxy-fuel burners, addressing the problem of lowering the flame temperature. The person skilled in the art would then be able, with knowledge from D2, to modify the burner arrangement of D1 to solve the above problem.

Therefore, the invention according to claim 1 is considered to lack an inventive step in view of D1 and D2. Also what is stated in claims 2-10, 16-17 and 19-21 is considered to lack an inventive step.

Consequently, the claimed invention according to claims 1-21 is novel and industrially applicable but it lacks an inventive step.